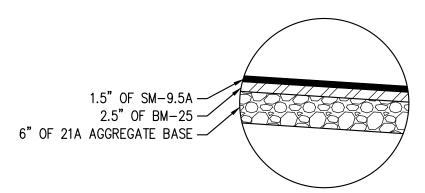
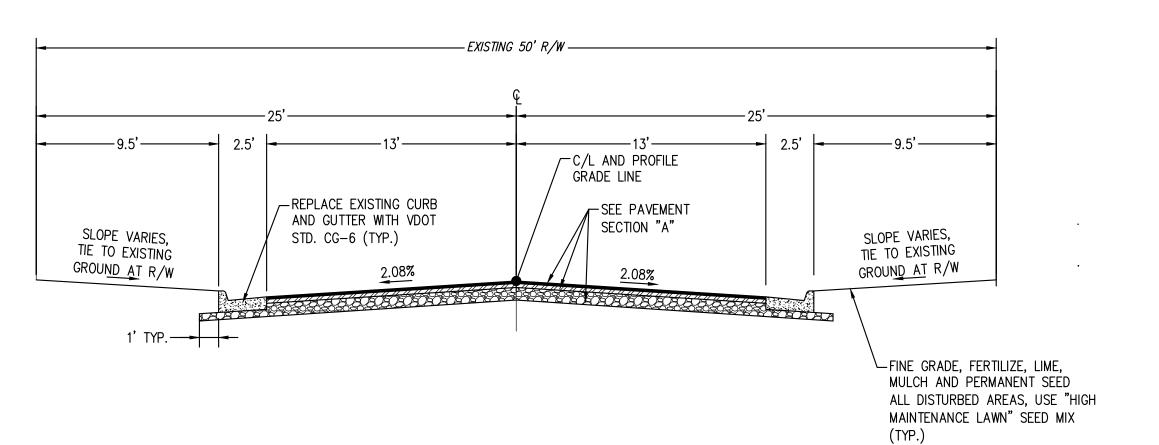


TYPICAL SECTION: (PAVEMENT SECTION B) BRUCE AVENUE - STA 10+25.98 TO STA 15+28.64

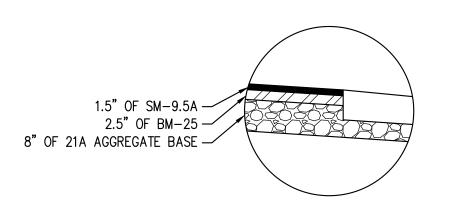


6" MINIMUM AGGREGATE BASE TO BE PROVIDED. IF 6" OR MORE OF SUITABLE MATERIAL EXISTS, THE TOP 3" (MINIMUM) SHALL BE SCARIFIED AND RECOMPACTED. PROVIDE ÀDDITIONAL 21A AGGREGATE BASE IF REQUIRED TO MEET FINISHED GRADE AS SHOWN ON PROFILE. IF LESS THAN 6" OF SUITABLE MATERIAL EXISTS, SCARIFY AND RECOMPACT (MIN. 3" DEPTH OR ENTIRE DEPTH IF LESS THAN 3" EXISTING) THEN PROVIDE 21A AGGREGATE BASE TO REACH 6"
MINIMUM TOTAL DEPTH, OR AS REQUIRED TO MEET FINISHED GRADE
AS SHOWN ON PROFILE.

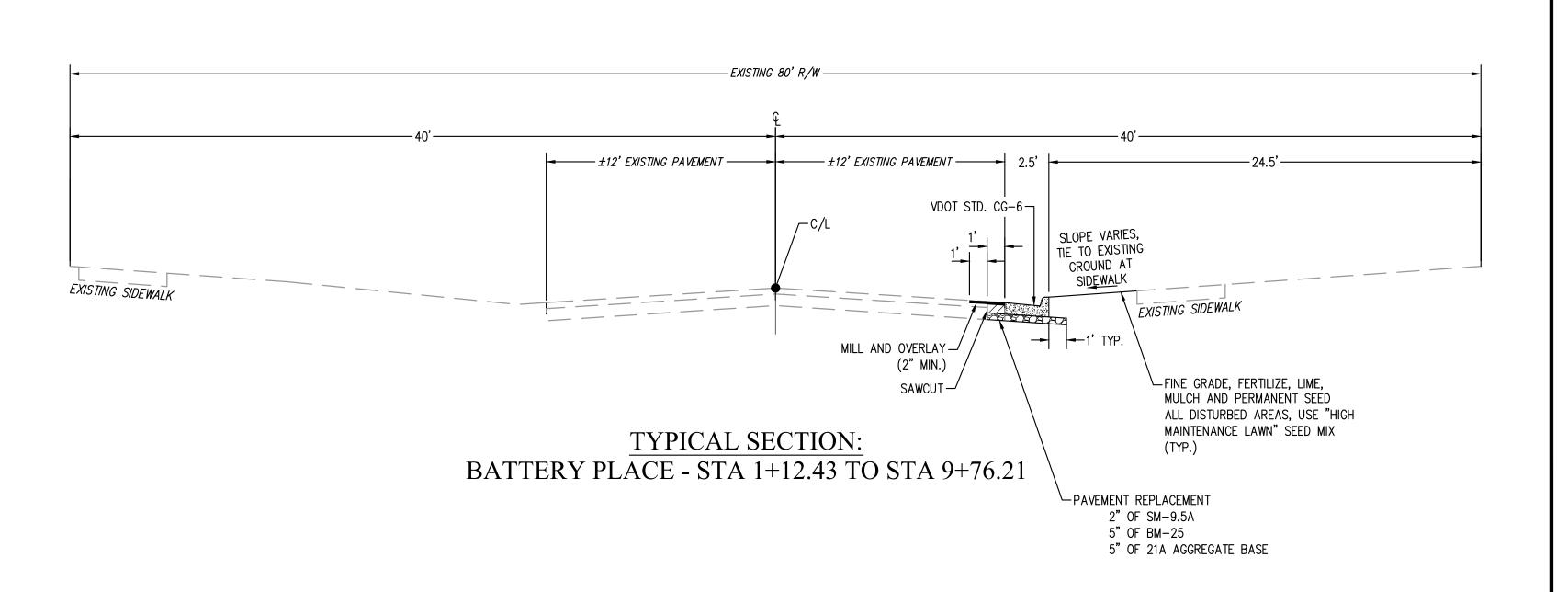
PAVEMENT SECTION "B"

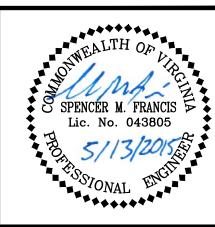


TYPICAL SECTION: (PAVEMENT SECTION A) BATTERY PLACE - STA 10+50 TO STA 19+09.81



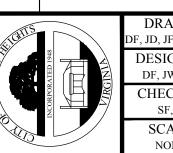
PAVEMENT SECTION "A" (REFER ALSO TO DETAIL CH-12)





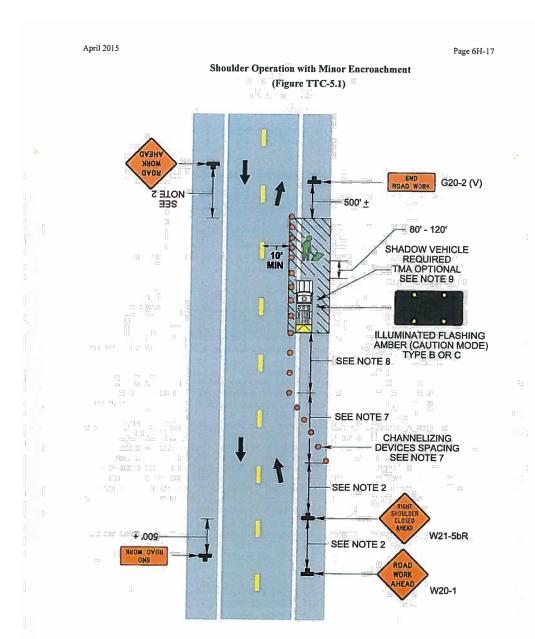
Bowman Consulting Group, Ltd. 3951 Westerre Parkway Suite 150 Richmond, Virginia 23233 Phone: (804) 616-3240 Fax: (804) 270-2008

SUBMITTAL DATE REVISION PROGRESS SET BID SET FINAL BID SET



CHECKED SF, JJ

SHEET NO. 11 OF 31



Page 6H-16 Typical Traffic Control Shoulder Operation with Minor Encroachment (Figure TTC-5.1)

NOTES

For required sign assemblies for multi-lane roadways see Note 1, TTC-4.

 Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less. 3. When work takes up part of a lane on a high volume roadway; vehicular traffic volumes, vehicle mix, speed and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment analysis permits a remaining lane width of 10 feet, the lane should be closed. If he closure operation is on a Limited Access highway, the minimum lane width is 11 feet.

4. The ROAD WORK AHEAD (W20-1) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.

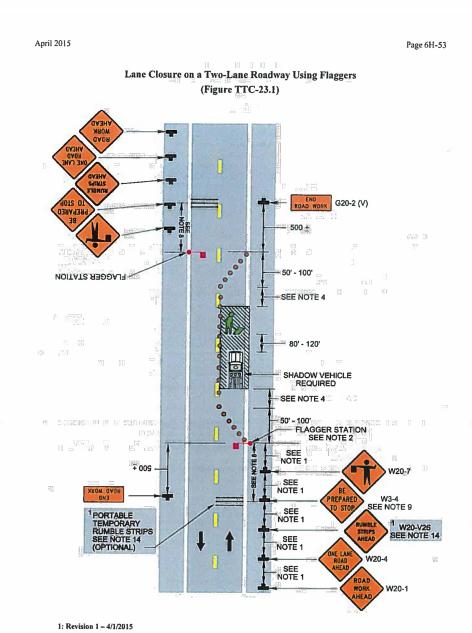
 A shadow vehicle with either an arrow board operating in the caution mode, or at least one high-intensity amber rotating, flashing, br oscillating light shall be parked 80' - 120' in advance of the first work crew.

Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, pri oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, pri oscillating lights.

Taper Length (L)					Channelizing Device Spacing		
Speed Limit (mph)	Lane Width (Feet)					Speed Limit (mpl	
	9	10	11	12	Location	0 - 35	36+
25	95	105	115	125	Transition Spacing	20'	40'
30	135	150	165	180	Travelway Spacing	40'	80'
35	185	205	225	245	Construction Access*	80'	120'
40	240	270	295	320	* Spacing may be increased to this distance but shall not exceed one access per ¼ mile.		
45	405	450	495	540			
50	450	500	550	600	On roadways with paved shoulders having width of 8 feet or more, channelizing devic shall be used to close the shoulder advance of the merging taper to dire vehicular traffic to remain within the travel		
55	495	550	605	660			
60	540	600	660	720			
65	585	650	715	780			
70	630	700	770	840	way.		
Minimum tape highwa				cess			
Shoulder							

8. The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit. 9. A truck-mounted attenuator (TMA) shall be used on Limited Access highways and multi-lane

roadways with posted speed limit equal to or greater than 45 mph. 10. When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed. 1: Revision 1 - 4/1/2015



Lane Closure Operation in an Intersection

(Figure TTC-28.1)

April 2015

Page 6H-52 **Typical Traffic Control** Lane Closure on a Two-Lane Roadway Using Flaggers (Figure TTC-23.1) **NOTES**

clear line of sight from the graphic flagger symbol sign to the flagger.

1. Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, and 500'-800' where the posted speed limit is greater than 45 mph. 2. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the flagger station and transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. Generally speaking, motorists should have a

3. Where Right-of-Way or geometric conditions prevent the use of 48" x 48" signs, 36" x 36" signs may be

4. Flagging stations shall be located far enough in advance of the work space to permit approaching traffic to reduce speed and/or stop before passing the work space and allow sufficient distance for departing traffic in the left lane to return to the right lane before reaching opposing traffic (see Table 6H-3 on Page 6H-5).

5. All flaggers shall be state certified and have their certification card in their possession when performing flagging duties (see Section 6E.01, Qualifications for Flaggers). 6. Cone spacing shall be based on the posted speed and the values in Table 6H-4 on Page 6H-6. A shadow vehicle with at least one high intensity amber rotating, flashing, or oscillating light shall be parked 80'-120' in advance of the first work crew.

A supplemental flagger may be required in this area to give advance warning of the operation ahead by slowing approaching traffic prior to reaching the flagger station or queued traffic.

9. If the queue of traffic reaches the BE PREPARED TO STOP (W3-4) sign then the signs, and if used the portable temporary rumble strips (PTRS). should be readjusted at greater distances. 9. When a highway-rail crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the highway-rail grade crossing, the temporary traffic control zone should be extended so that the transition area precedes the highway-rail crossing (see Figure TTC-56 for additional information on highway-rail crossings).

11. At night, flagger stations shall be illuminated, except in emergencies (see Section 6E.08).

12. Cones may be eliminated when using a pilot vehicle operation or when the total roadway width is 20 13. For low-volume situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6E).

14. When approved for use, three portable temporary rumble (PTRS) strips shall be installed across the entire travel has adjacent to the BE PREPARED TO STOP (W3-4) sign. The portable temporary rumble strips shall be monitored and adjusted as necessary during the work shift easure proper placement on the roadway. When the PTRS are installed, the RUMBLE STRIP AHEAD (W20-V26) sign shall also be utilized.

Page 6H-62 Typical Traffic Control Lane Closure Operation in an Intersection

(Figure TTC-28.1) 1. The control of traffic through the intersection in order of preference should be:

 a. Obtain the services of law enforcement personnel. b. Detour the effective routes to other roads and streets as approved and directed by the Regional c. Place a state certified flagger on each leg of the intersection controlling a single lane of traffic.

April 2015

Appropriate signing as shown should be used for law enforcement and flagging operations. For detour signs see Figure TTC-34. 2. Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, 500'-800' where the posted speed limit is greater than 45 mph.

3. Channelizing device spacing shall be on 20' centers or less.

If room permits, a shadow vehicle with at least one rotating amber light or high intensity amber flashing or osaillating light should be parked 80'-120' in advance of the first work crew.

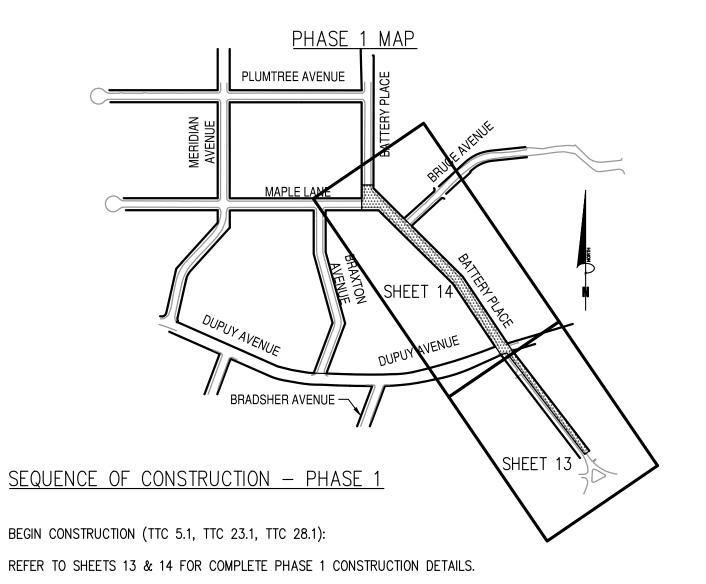
5. For emergency situations (any non-planned operation) of 30 minutes or less duration, two rotating amber lights or high intensity amber Dashing or oscillating lights mounted on the vehicle and visible for 360° shall be required in addition to the channelizing devices shown around the vehicle. Also, vehicle hazard warning signals shall be used.

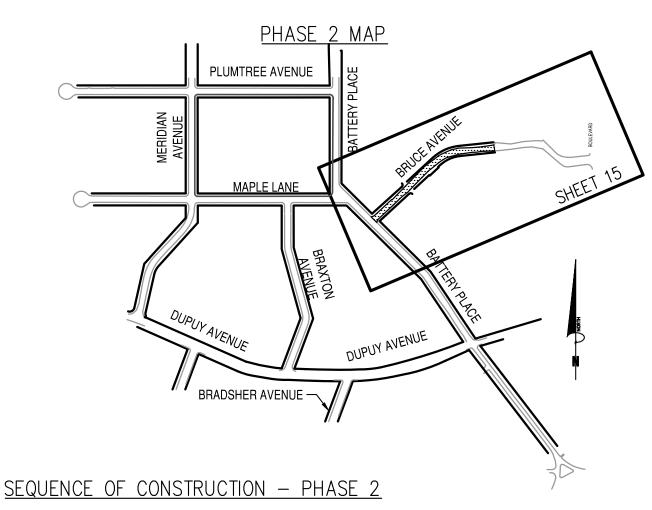
6. If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure TTC-36. 7. Turns can be prohibited as required by vehicular traffic conditions. Unless the streets are wide, it might

be physically impossible to make certain turns, especially for large vehicles.

1: Revision 1 - 4/1/2015

OVERVIEW PHASE MAPS FOR REFERENCE ONLY, REFER TO SHEETS 13-15 FOR LAYOUT DETAILS





BEGIN CONSTRUCTION (TTC 23.1 & TTC 28.1):

REFER TO SHEET 15 FOR DETAILS FOR PHASE 2.

TRANSPORTATION MANAGEMENT PLAN (TMP)

BRUCE AVENUE DRAINAGE IMPROVEMENTS PLAN.

<u>INTRODUCTION</u>

DRAINAGE IMPROVEMENTS ALONG BRUCE AVENUE AND BATTERY PLACE, CROSSING DUPUY ROAD IN COLONIAL HEIGHTS, VIRGINIA WILL INCLUDE RECONSTRUCTION OF EACH LANE.

TEMPORARY TRAFFIC CONTROL GENERAL NOTES

1. ALL TRAFFIC MAINTENANCE AND CONTROL DEVICES, METHODS AND APPLICATIONS WILL CONFORM TO THE FOLLOWING PUBLICATIONS AND REPORTS INCLUDING ALL CURRENT EDITIONS AND REVISIONS, UNLESS OTHERWISE APPROVED OR DIRECTED BY THE CITY DEPARTMENT OF PUBLIC WORKS (DPW):

A. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS ISSUED BY THE U.S. DEPARTMENT OF

TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (MUTCD). B. VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS VOL. II.

C. VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS.

D. VIRGINIA DEPARTMENT OF TRANSPORTATION WORK AREA PROTECTION MANUAL, 2011 EDITION (REVISION 1), (VA WAPM). E. CITY OF COLONIAL HEIGHTS, PUBLIC WORKS SPECIFICATIONS AND STANDARDS MANUAL.

2. THE CONTRACTOR SHALL PLAN AND EXECUTE THE WORK IN ACCORDANCE WITH THE FOLLOWING:

A. GENERALLY, CONSTRUCTION ACTIVITIES WILL BE CONDUCTED WHILE ROADWAY TRAVEL IS TEMPORARILY LIMITED. NOTIFICATION SHALL BE IN ACCORDANCE WITH THE CITY DPW'S PERMIT. B. IT IS ANTICIPATED THAT THE FOLLOWING 2011 VIRGINIA WORK AREA PROTECTION MANUAL, 2011 EDITION (REVISION 1), TYPICAL

TRAFFIC CONTROL APPLICATIONS WILL BE USED TO PERFORM THE CONTRACT WORK: TTC-5.1, TTC-23.1, & TTC-28.1. DURING PERIODS THAT OPERATIONS ARE PERFORMED UNDER TRAFFIC, THE SPEED LIMIT SHALL REMAIN AS POSTED. IN ADDITION, "ROAD WORK AHEAD" SIGNS SHALL BE PLACED IN ADVANCE OF THE WORK ZONE.

C. THE CONTRACTOR SHALL SUBMIT A MAINTENANCE OF TRAFFIC SCHEDULE, INCLUDING ALL PROPOSED LANE AND SHOULDER CLOSURES, AT LEAST TWO WEEKS PRIOR TO THE ACTUAL CLOSURES ARE TO BEGIN FOR REVIEW AND APPROVAL.

D. THE CONTRACTOR SHALL SUBMIT THE FINAL PLAN OF ALL PROPOSED LANE AND SHOULDER CLOSURES BY THE CLOSE OF BUSINESS WEDNESDAY FOR WORK IN THE FOLLOWING WEEK (REQUIRING THE LANE OR SHOULDER CLOSURES) IN ORDER FOR THE DEPARTMENT TO NOTIFY THE GENERAL PUBLIC AND APPROPRIATE PUBLIC ENTITIES. LANE CLOSURES WILL BE PERMITTED WITH PRIOR APPROVAL FROM THE CITY DPW.

E. AN ONSITE REVIEW OF THE PROJECT'S WORK ZONE TRAFFIC CONTROL BY THE PROJECT MANAGEMENT TEAM, CITY TRAFFIC ENGINEER AND CONTRACTOR SHALL BE CONDUCTED WITHIN 24 HOURS OF ANY FATAL INCIDENT/CRASH WITHIN THE WORK ZONE.

F. ALL TRAFFIC CONTROL DEVICES AND SIGNS NECESSARY FOR THE MAINTENANCE OF TRAFFIC ARE TO BE SUPPLIED, INSTALLED AND MAINTAINED, AND REMOVED BY THE CONTRACTOR.

H. ALL TRAFFIC CONTROL DEVICE LOCATIONS SHALL BE MARKED BY THE CONTRACTOR AND REVIEWED BY THE ENGINEER PRIOR TO INSTALLATION.

I. ALL SIGNS WILL BE EITHER REMOVED FROM THE ROADWAY WHEN NOT NEEDED OR COVERED PER SECTION 6F.04 OF THE VIRGINIA WORK AREA PROTECTION MANUAL, 2011 EDITION (REVISION 1).

J. SOME SKETCHES AND DRAWINGS ARE NOT TO SCALE AND SHALL BE USED FOR REFERENCE ONLY. K. SIDEWALK CLOSURES SHALL BE IN ACCORDANCE WITH TTC-35.1 AND TTC-36.1, IF APPLICABLE.

GROUP 2 CHANNELIZING DEVICES ARE TO BE PLACED AS DIRECTED BY THE VA WAPM, PAGE A-7.

ALLOWABLE WORK TIME SHALL ONLY BE FROM 9:00 AM - 3:00 PM (WEEKDAYS ONLY) FOR ANY LANE CLOSURES IN THE ROADWAY AREA OF DUPUY AVENUE. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION INSPECTOR AT LEAST 24 HOURS PRIOR TO ANY LANE CLOSURES WITHIN THE ROADWAY.

TEMPORARY LANE WIDTHS ARE NOT TO BE LESS THAN THE EXISTING LANE WIDTH (DESIRABLE 11' MINIMUM). IF AN 11' TRAVEL LANE CANNOT BE MAINTAINED, ALTERNATE ROUTES OR BYPASSES MUST BE USED TO REROUTE TRAFFIC AROUND THE WORK ZONE AREA. PRIOR APPROVAL MUST BE GRANTED TO THE CONTRACTOR BY THE CITY DEPARTMENT OF PUBLIC WORKS FOR ANY DETOURS.

6. TEMPORARY THRU TRAFFIC CLOSURE ON BATTERY PLACE (DETOUR) WILL BE ALLOWED DURING ALLOWABLE WORK TIMES ONLY DURING ACTIVE TRENCHING OPERATIONS. DETOUR SIGNING AND BARRICADES SHALL BE REMOVED DAILY AND THE ROADWAY OPENED

7. NO OBJECTS, EQUIPMENT, OR STORED MATERIALS MAY INTERFERE WITH SIGHT DISTANCE OF ENTRANCES AND INTERSECTIONS. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE PLACED PER THE VIRGINIA WORK AREA PROTECTION MANUAL, 2011 EDITION

(REVISION 1) OR AS DIRECTED BY THE ENGINEER. 8. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PRIVATE & RESIDENTIAL ENTRANCES DURING OPERATIONS.

ALL AREAS EXCAVATED BELOW EXISTING PAVEMENT SURFACES AT THE CONCLUSION OF EACH WORKDAY SHALL BE BACKFILLED TO FORM A 4:1 WEDGE AGAINST PAVEMENT SURFACE FOR THE SAFETY AND PROTECTION OF VEHICULAR TRAFFIC. ALL COSTS FOR PLACING, MAINTAINING AND REMOVING THE 4:1 WEDGE SHALL BE INCLUDED IN THE PRICE BID OR OTHER ITEMS AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

10. THE CONTRACTOR SHALL PROVIDE TEMPORARY DRAINAGE AS REQUIRED TO PREVENT PONDING OF WATER ON THE ROADWAY AND ADJACENT PROPERTIES AT NO ADDITIONAL COST TO THE CITY.

11. CONTRACTOR SHALL PROTECT ANY EXISTING GUARDRAIL AND SUPPORTS WITHIN CONSTRUCTION AREA FROM DAMAGE. ANY GUARDRAIL OR SUPPORTS DAMAGED DURING CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED TO PRE-CONSTRUCTION CONDITIONS

BY THE CONTRACTOR. 12. ALL COORDINATION FOR MAINTENANCE OF TRAFFIC SHALL BE PERFORMED BY THE CITY DEPARTMENT OF PUBLIC WORKS PERMITS OFFICE. THE CONTACT NUMBERS ARE:

DEPARTMENT OF PUBLIC WORKS, ENGINEERING & DEVELOPMENT DIVISION 804-520-9334

13. THIS TRAFFIC MANAGEMENT PLAN WAS PREPARED BY SAVANNAH AMOR, EIT (CERT. # 091112008) WHO SUCCESSFULLY COMPLETED THE ADVANCED WZTC ON 09/11/2012.

SPECIAL DETAILS

THERE ARE NO SPECIAL DETAILS FOR THIS PROJECT THAT ARE NOT ADDRESSED IN THE PLANS OR THE VIRGINIA WORK AREA PROTECTION MANUAL, 2011 EDITION (REVISION 1).

PUBLIC COMMUNICATIONS PLAN

PROJECT STAFF IS TO COORDINATE WITH THE CITY DEPARTMENT OF PUBLIC WORKS PERMIT OFFICE TO PUBLISH ANNOUNCEMENTS REGARDING WORK ACTIVITIES FOR THE PROJECT. EACH ACTIVITY WILL BE GOVERNED BY THE TIMES ESTABLISHED BY THE CITY TRAFFIC ENGINEER. NOTIFICATIONS OF CONSTRUCTION START/END DATES AND WORK ZONE INFORMATION WILL BE PROVIDED BY THE CONTRACTOR TO THE CITY DEPARTMENT OF PUBLIC WORKS.

TRANSPORTATION OPERATIONS PLAN

1. THE CONTRACTOR IS TO ADVISE THE DEPARTMENT OF PUBLIC WORKS OF PLANNED LANE CLOSURES A MINIMUM OF 24 HOURS IN ADVANCE OF PROPOSED ROAD/LANE CLOSURES.

2. THE FOLLOWING IS A LIST OF LOCAL EMERGENCY CONTACTS:

CITY POLICE OFFICE: 804-520-9226 HAZ-MAT CENTER (IF SPILL INVOLVED) 911

3. PROCEDURES TO RESPOND TO TRAFFIC INCIDENTS THAT MAY OCCUR IN THE WORK ZONE: A. CONTRACTOR TO NOTIFY COUNTY SHERIFF'S OFFICE AND THE CITY DPW'S PERMITS OFFICE IMMEDIATELY.

B. DEPENDING UPON THE SEVERITY OF THE INCIDENT, THE CONTRACTOR MAY HAVE TO SHUT DOWN WORK. C. UPON ARRIVAL AT THE SCENE, THE COUNTY POLICE WILL DETERMINE THE RESPONSE NECESSARY TO ALLOW

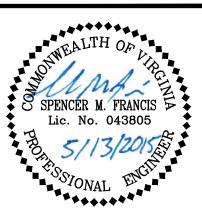
TRAVELING PUBLIC AROUND INCIDENT. D. CONTRACTOR SHOULD TAKE PICTURES AS NECESSARY, ESPECIALLY PICTURES OF WORK ZONE TO VERIFY THE PROPER

E. INSPECTOR TO NOTIFY CITY DPW OF INCIDENT AND TAKE PICTURES AS NECESSARY, ESPECIALLY PICTURES OF CONTRACTOR'S WORK ZONE TO VERIFY THE PROPER SETUP.

4. PROCESS OF NOTIFICATION INCIDENT TO FOLLOW IS: CONTRACTOR TO CALL:

A. CITY DEPARTMENT OF PUBLIC WORKS: 804-520-9334

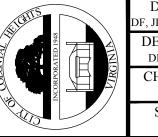
B. CITY POLICE OFFICE: 804-520-9226.





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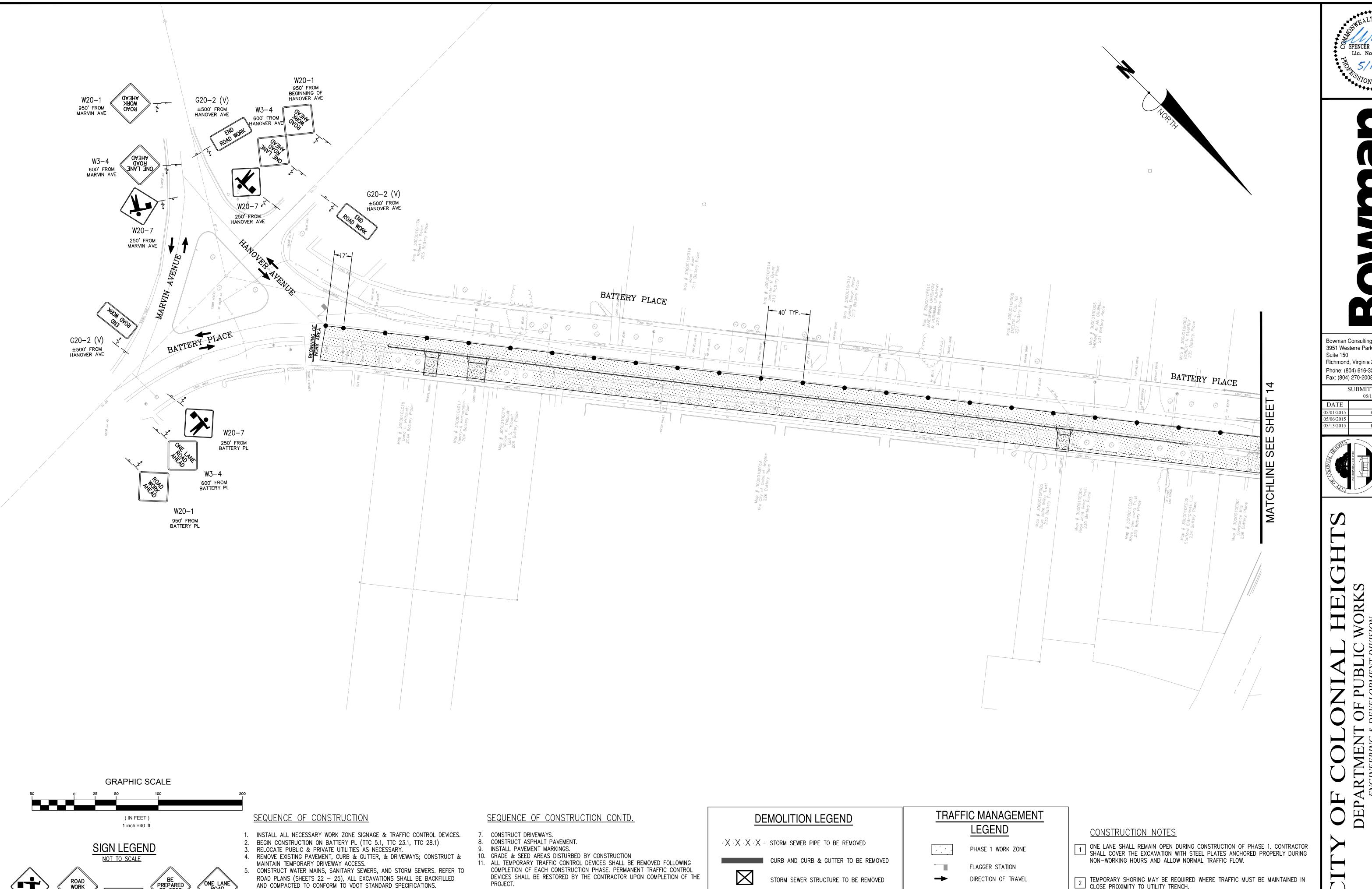
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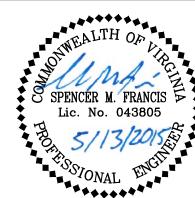
SHEET NO. 12 OF 31

Page 6H-63



SANITARY SEWER PIPE TO BE REMOVED

· //// · EXISTING WATER MAIN TO BE REMOVED



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SUBMITTAL DATE REVISION PROGRESS SET BID SET FINAL BID SET

CHECKED

BRUC

TEMPORARY SHORING MAY BE REQUIRED WHERE TRAFFIC MUST BE MAINTAINED IN CLOSE PROXIMITY TO UTILITY TRENCH.

TRUCK-MOUNTED ATTENUATOR

SHEET NO. 13 OF 31

6. CONSTRUCT AGGREGATE PAVEMENT BASE AND CURB & GUTTER.